

1. A method for use in processing an analog electrical signal in a laser scanning bar code reader containing information representative of reflected light from indicia including regions of different light reflectivity, wherein the analog electrical signal contains edge transitions corresponding to boundaries between adjoining regions of different light reflectivity of the indicia, comprising the steps of:

analyzing the edge transitions of at least a part of the analog electrical signal to determine a level of blur in that part of the analog electrical signal; and

based on the determined level of blur, selecting one of a plurality of different techniques for processing that part of the analog electrical signal to produce a digitized electrical signal in which transitions in the digital level of the signal correspond to boundaries between adjoining regions of different light reflectivity of the indicia.

2. The method of claim 1 wherein the step of analyzing the edge transitions is performed on a plurality of different parts of the analog electrical signal and different digitizing techniques are used on the different parts of the analog signal depending on the level of blur in the different parts of the analog signal.

3. The method of claim 1, further comprising ranking the edge transitions by magnitude; and analyzing the ranked edge transitions to detect the extent of blur represented in the part of the analog electrical signal.

4. The method of claim 3 wherein the ranking is done by forming a histogram of the magnitudes of the edge transitions.

5. The method of claim 3, further comprising

if the part of the analog electrical signal has edge transitions of substantially different magnitudes, determining that significant blur is represented in that part of the analog electrical signal.

5           6. The method of claim 5, further comprising  
rejecting edge transitions having less than a threshold magnitude.

7. The method of claim 5, further comprising  
grouping the edge transitions into sets by magnitude; and  
10          testing whether the difference between a first magnitude associated with a first set  
and a second magnitude associated with a second set is substantially equal to the difference  
between the first magnitude and a third magnitude associated with a third set.

8. A method for use in processing an analog electrical signal in a laser scanning bar  
15          code reader containing information representative of reflected light from indicia including  
regions of different light reflectivity, wherein the analog electrical signal contains edge  
transitions corresponding to boundaries between adjoining regions of different light  
reflectivity of the indicia, comprising the steps of:

                determining whether an edge transition corresponds to a boundary between  
20          adjoining regions of substantially equal width; and

                based on the determination, producing a digitized electrical signal in which  
transitions in the digital level of the signal correspond to the boundaries between adjoining  
regions of different light reflectivity of the indicia.

25          9. The method of claim 8, further comprising

determining whether at least a part of the analog electrical signal is inconsistent with an alternating dark-and-light feature of a bar code symbol.

10. The method of claim 9, further comprising  
5 if the inconsistency is found, rejecting at least that part of the analog electrical signal.

11. The method of claim 8, further comprising  
determining whether a part of the analog electrical signal crosses a magnitude  
10 threshold more than once.

12. The method of claim 11, further comprising  
if the part is found to cross the magnitude threshold more than once, rejecting at  
least the part of the analog electric signal.

13. The method of claim 8, further comprising  
determining the extent to which an edge transition that corresponds to a boundary  
15 between two adjoining regions of different widths is affected by one of the regions.

14. A method for use in processing an analog electrical signal in a laser scanning bar code reader containing information representative of reflected light from indicia including regions of different light reflectivity, wherein the analog electrical signal contains edge transitions corresponding to boundaries between adjoining regions of different light reflectivity of the indicia, comprising the steps of:

determining that the analog electrical signal contains edge transitions corresponding to less than all of the boundaries between the adjoining regions of different light reflectivity of the indicia;

for at least part of the analog electrical signal, determining the number of boundaries that lack corresponding edges; and

based on the determination about the number of boundaries that lack corresponding edges, producing a digitized electrical signal in which transitions between the digital level of the signal correspond to boundaries between regions of different light reflectivity of the indicia.

15. The method of claim 14, further comprising determining information about the relative positioning of the boundaries that lack corresponding edge transitions.

16. The method of claim 14, further comprising determining information about the relative positioning of at least three boundaries that lack corresponding edge transitions.

17. The method of claim 14, further comprising determining information about the relative positioning of boundaries that lack corresponding edge transitions, between regions of dissimilar light reflectivity of the indicia.

18. The method of claim 17, wherein the relative positioning is determined with respect to intermediate points in the regions.

5 19. The method of claim 14, further comprising  
determining information about the relative positioning of boundaries that lack  
corresponding edge transitions, between regions of similar light reflectivity of the indicia.

10 20. The method of claim 19, wherein the relative positioning is determined with  
respect to intermediate points in the regions.

21. A method for use in processing an analog electrical signal in a laser scanning  
bar code reader containing information representative of reflected light from indicia  
including regions of different light reflectivity, wherein the analog electrical signal contains  
15 edge transitions corresponding to boundaries between adjoining regions of different light  
reflectivity of the indicia, comprising the steps of:

determining the relative heights of edge transitions in the analog electrical signal;  
and

20 depending on the relative heights, selecting one of a plurality of different techniques  
for processing the electrical signal to produce a digitized electrical signal in which  
transitions in the digital level of the signal correspond to boundaries between adjoining  
regions of different light reflectivity of the indicia.

22. A method for use in processing an analog electrical signal in a laser scanning bar code reader containing information representative of reflected light from indicia including regions of different light reflectivity, wherein the analog electrical signal contains edge transitions corresponding to boundaries between adjoining regions of different light reflectivity of the indicia, comprising the steps of:

analyzing the edge transitions to classify at least a part of the analog electrical signal into one of three categories corresponding to slight, moderate, or severe levels of blur in that part of the analog electrical signal;

if the part of the analog electrical signal is classified into the category corresponding to a slight level of blur or into the category corresponding to a moderate level of blur, based on half-height points in edge transitions in the analog electrical signal, determining information about the relative positions of boundaries between adjoining regions of different light reflectivity of the indicia;

if the part of the analog electrical signal is classified into the category corresponding to a severe level of blur, based on a determination about the number of regions disposed between regions about which relative positioning information is known, determining information about the relative positions of boundaries between adjoining regions of different light reflectivity of the indicia; and

based on the information determined about the relative positions, producing a digitized electrical signal in which transitions between the digital level of the signal correspond to boundaries between regions of different light reflectivity of the indicia.

23. A method of processing an analog electrical signal in a laser scanning bar code reader containing information representative of reflected light from indicia including regions of different light reflectivity, wherein the electrical signal contains edge transitions corresponding to boundaries between adjoining regions of different light reflectivity of the indicia, comprising the steps of:

processing the electrical signal to determine a set of possible edge transition points in said signal;

classifying at least some of the edge transition points against a predetermined amplitude and frequency threshold into at least two categories corresponding to the

frequency spectrum or blur of the signal associated with each edge transition point; and

separately processing each set of edge transition points in each category as a result of the classifying step, and combining the result producing a digitized electrical signal in which transitions between the digital level of the signal correspond to boundaries between regions of different light reflectivity of the indicia.

24. A method for use in processing an analog electrical signal in a laser scanning bar code reader containing information representative of reflected light from indicia including regions of different light reflectivity, wherein the analog electrical signal contains edge transitions corresponding to boundaries between adjoining regions of different light reflectivity of the indicia, comprising the steps of:

detecting edge transitions in the analog scan signal;

determining the level of blur in the vicinity of each of a plurality of edge transitions;

digitizing the edge transitions differently based on the determined level of blur in the vicinity of the edge transition;

combining the results of the digitizing step to produce a digitized electrical signal from the analog scan signal.